

# A Proposal for Detecting and Managing Gestational Diabetes by Coordinating Existing Services

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## Synopsis .....

*A significant improvement in the quality of births by low-income women can be achieved by imple-*

*menting a low-cost screening procedure and by coordinating private and public sector services that these women may already be receiving. This proposal outlines a screening program for gestational diabetes, coupled with multidisciplinary team management of this disorder through cooperative efforts of private sector medical practitioners and the public sector nutrition program for Women, Infants, and Children (WIC). The investment in this proposal is catalytic: the long-term intent is to persuade those in the medical community in the targeted geographic area to adopt the screening procedure and coordination with the WIC Program as a standard part of their prenatal care. If this proposed program is successful, it could be replicated in other parts of the country.*

**P**ERHAPS THE GREATEST IMPACT we can have on the lives of individuals and on society in general is to promote a healthy beginning in life. The health of an infant sets a foundation for the rest of his or her life. Clearly, the family suffers when a child's health is impaired, but society too may bear the costs: medical expenses, loss of productivity, and potential need for public assistance. Thus, in areas where we know we can easily intervene to prevent major perinatal problems, our investment of health care resources stands to reap the greatest benefits.

One such area lies in the management of diabetes during pregnancy. Gestational diabetes, also known as class A diabetes, is the most common form. This is the diabetes of pregnancy, manifesting itself for the first time in the second or third trimester. Uncontrolled diabetes can have devastating effects on a pregnancy. The incidence of congenital abnormalities and perinatal mortality are increased (1-4). There are increases in neonatal morbidity such as respiratory distress syndrome, hypoglycemia, and hyperbilirubinemia, which have been reported to occur in as many as 25 percent of these pregnancies (3). Macrosomia is a frequent complication leading to birth trauma and difficult deliveries (2,3). The mother may suffer additional physical insults, with increased risk of hypertensive disorders and polyhydramnios (2).

Gestational diabetes occurs much more frequently than overt diabetes. Most studies estimate that gestational diabetes occurs in 2 to 3 percent of all pregnancies (5,6), but some recent studies suggest that the incidence may be 6 percent (7,8) or even as much as 12 percent (4). It has been noted that during the course of pregnancy, 10 percent of gestational diabetics will require insulin therapy (1) and, within 10 years of the pregnancy, more than 50 percent of these women will experience adult onset diabetes (9,10).

The impact of gestational diabetes within a community can be substantial. One of its complications, perinatal mortality, has been estimated to occur in 5 to 19 percent of the pregnancies among uncontrolled gestational diabetics (1). Using this estimate, gestational diabetes could account for 1 to 5 deaths per 1,000 live births in a community where it occurs in 2.5 percent of all pregnancies. This is 6 to 29 percent of the 1980 national perinatal mortality rate of 17.5 per 1,000 live births (that is, neonatal death rate plus fetal death rate).

But the picture need not be this bleak. With good management, the pregnancy outcomes of gestational diabetics have been shown to be as good or better than those of the general population (1-3). The problem lies in providing appropriate management as it is needed. There are at least two reasons

to believe that this help is often lacking in some communities.

- Gestational diabetes is not being detected at the expected rates. Decisions to test for gestational diabetes are commonly based on past histories or risk factors. This approach has been shown to be insufficient for sensitive and specific detection of gestational diabetes (5,11).
- Often there is not optimal management of the disorder. Early intervention, frequent blood sugar monitoring, and the health care team approach (physician, nursing staff, nutritionist, and others) constitute what is considered to be the most effective form of care (1-4,12). Early intervention requires an appropriate detection procedure, as noted previously. Blood sugar monitoring is necessary to evaluate the effectiveness of care and need for modifications; however, perceived costs and scheduling problems may lead to less frequent testing than would be ideal. Studies indicate that good outcomes depend on blood sugar control, and the key to this is dietary management. Most medical practitioners are not skilled in dietary counseling, nor is it cost effective for them to provide it. Thus, the team should consist minimally of the medical provider and a nutritionist. The services of a nutritionist, however, are not often available through private medical practices.

Because of limited access to care, gestational diabetics with low incomes are even more likely to go undetected and unmanaged. Even the rate of undetected pre-existing diabetes is likely to be high. Given limited access to care and the comparatively high incidence of adverse outcomes of pregnancy among the poor, it seems more imperative to intervene in this population than in any other.

## Proposal

**Screening.** There is a low-cost screening procedure for gestational diabetes that is simple, sensitive, and specific (2,3,5,6,8,10,12). It consists of a blood sugar test 1 hour after glucose is taken orally, and the procedure is performed at the point in gestation when blood sugar is likely to become abnormal. This test has been shown to be an effective screening test even without prior dietary preparation (5). Positive results are followed up with a 3-hour glucose tolerance test, the results of which are considered to be the diagnostic criteria for gestational diabetes. One recent paper indicated that use of this procedure added less than \$2 to the costs of caring for each patient (8).

It is proposed that the screening procedure be done using a portable and relatively inexpensive blood glucose reflectance meter, which requires only a drop of blood (for example, from a finger) for analysis. These hand-held machines have improved in accuracy and reliability to the point that they are comparable to laboratory analysis (13-15) and will suffice for a screening procedure. Results are available immediately and inexpensively, with little staff training required. These factors make the reflectance meters highly useful for mass screenings in settings accessible to low-income prenatal patients. Laboratory analysis would be required for the 3-hour glucose tolerance test, which would be ordered through the medical provider.

One setting accessible to these pregnant women can also serve as the source of nutrition services: the site of the local Women, Infants, and Children (WIC) Program. This federally funded program is administered locally, and it provides nutrition education and specific foods needed to supplement the diets of infants, young children, and pregnant and lactating women. Participants in the program must have a low income, be currently under the care of a medical practitioner, and be considered to have a nutrition-related problem, such as diabetes. The WIC Program, which operates from locations that are selected to be accessible to clients, requires the services of a trained nutritionist, usually a registered dietitian. Most local WIC Programs have contact with participants at least once a month. Screening for gestational diabetes could be done in conjunction with local WIC services, but also be open to persons who do not participate in the WIC program.

**Team management.** Team management would be achieved through coordination of WIC services with those of the medical practitioner. This coordination originated because the medical practitioner must provide WIC with some initial data on the client and certify that the client is indeed under his or her care for this pregnancy. However, this communication is now generally one-way, limited, and usually occurs only at the start of WIC services.

One of this proposal's goals is to make the relationship between the WIC Program and the medical practitioner more integrated. Prior to conducting the screening, the local medical community would be informed about the project. Information would consist of education as well as outreach, with the project's goals, rationale for its criteria, recommendations, and nutritional management plans presented in the context of a medical update on diabe-

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tes in pregnancy. After implementation of this proposal, screening would occur at WIC Program sites, and results would be provided to the client's medical practitioner. Positive results would also be followed up with a phone call to the provider to discuss the availability of the project's services. The aim is to have the practitioner make the diagnosis and determine the management plan (including insulin, if necessary).

The WIC Program would receive the diet prescription and other pertinent medical data and begin dietary counseling. The client would be seen by WIC staff for counseling at least monthly, at which time blood sugar monitoring with the portable reflectance meter could also be done. Both the WIC Program and the private practitioner would share progress information and recommendations. After delivery, the patient would be given information on her increased risk of future diabetes, recommendations on appropriate diet and control of weight, and advice to seek periodic screening in the future.

**Targeting.** To ensure that the program is implemented where it will be the most effective, a target area should have the following characteristics:

- a large low-income population,
- little current screening for gestational diabetes, and
- reason to believe that gestational diabetes is going undetected (for example, WIC records showing that the incidence of gestational diabetes is less than 2.5 percent among the current caseload of clients, all of whom are considered to be at nutritional risk).

**Evaluation and integration into the community.** The project would be evaluated at the conclusion of its funding period. The success of the project would be promoted to the medical community; if practition-

ers are convinced of the project's value they would adopt both the screening procedure and coordination with the WIC Program as part of their normal prenatal care. If that occurred, this proposal's achievements would go beyond improvements related to gestational diabetes.

First, the network between private practitioners and the WIC Program would result in improved team management of other prenatal and infant problems such as hypertension, poor weight gain, anemia, and failure to thrive.

Second, the future health of women with gestational diabetes during pregnancy could be improved. Because these women are at higher risk of adult onset diabetes, periodic screening could allow early intervention, and modified health habits could limit or even prevent its onset.

## **Project Specifications**

**Goals and objectives.** The scope of the project would entail the following goals and objectives.

*Goal 1.* The incidence of adverse outcomes to low-income pregnancies should be decreased by improving the detection and management of gestational diabetes.

- Objective 1. At least 80 percent of the prenatal women who take advantage of the community's WIC services before the third trimester will be screened for gestational diabetes, and this information will be passed on to their medical providers. This service will also be available to prenatal women who do not use WIC services.
- Objective 2. As an indicator of effective detection, the percentage of prenatal women in the WIC Program diagnosed as gestational diabetics should be greater than or equal to the expected 2.5 percent of the current caseload at the project's conclusion.
- Objective 3. At the end of the project, at least 80 percent of those providing obstetric services to low-income women within the community will adopt this proposal's screening procedure as part of their routine prenatal care.

*Goal 2.* The effectiveness of multidisciplinary team management of maternal and infant care within a community should be increased by promoting greater cooperation between private medical providers and the nutrition services of the public sector's WIC Program.

- Objective 1. All WIC clients diagnosed as having gestational diabetes will be team managed by the

medical provider and the WIC nutritionist.

• Objective 2. At the end of the project, an improvement in communications between the WIC Program and those providing obstetric medical services to WIC clients can be demonstrated.

**Time frame.** The project should be funded for at least 3 years. The first 6 months would be for start-up, including education of the local medical community and promotion to the public. To obtain sufficient data, the project would serve the community for 2 years, with an evaluation and any necessary modifications made at the end of the first year. At the conclusion of the 2-year period, 6 months would be allowed to conduct a final evaluation and to inform the medical community of the project's achievements.

**Screening procedure.** Clients are screened at WIC sites at 24 to 28 weeks of gestation, with a blood sample taken 1 hour after intake of 50 grams of glucose (2,3,5,6,8,10,12). The sample, which consists of a drop of blood from a lanced finger, is analyzed on reagent strips in a portable reflectance meter, such as a Glucometer (Ames Division of Miles Laboratory, Elkhart, IN) or an Accuchek BG (Bio-Dynamics Division of Boehringer Mannheim Company, Indianapolis, IN). If results are greater than 130 mg/dl, a 3-hour glucose tolerance test ordered by the medical provider should follow.

To monitor gestational diabetics, fasting blood sugars should be taken and analyzed with the portable reflectance meter at least monthly at the time of the WIC appointment. These data are referred to the medical provider. The goal is to keep fasting blood sugars below 100 mg/dl.

**Required resources.** The project's coordinator should have a master's degree in public health and preferably be a nurse or a nutritionist. The screening will be conducted by the coordinator and, if the caseload requires it, one or more health assistants.

Primary equipment consists of a blood glucose reflectance meter, reagent strips, and equipment to obtain "finger-stick" blood samples. Glucose solutions will also be required. Note that a meal cannot substitute for the glucose; clients vary in the types and timings of meals for postprandial testing, and it has been shown that blood glucose reaction to a glucose solution differs substantially from its reaction to carbohydrate combined with other foods (16).

**Evaluation criteria.** Evaluation should, at a minimum, address the objectives previously stated. The

overall impact of the program on the community's perinatal outcomes can also be assessed if there is an adequate population size and sufficient data on the incidence of prematurity, respiratory distress syndrome, and other complications attributable to gestational diabetes. If the evaluation indicates success, this program could be replicated in other parts of the country.

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